

**Instructor Information:**Gary M. Baker FW 426 [gbaker@niu.edu](mailto:gbaker@niu.edu)

Use the e-mail address listed above for all out-of-class concerns. The e-mail address that is listed for me on Blackboard, [gbaker@cties.niu.edu](mailto:gbaker@cties.niu.edu), is no longer valid. Do not use it.

**Office Hours:** Tues, Thurs - immediately after class, or by appointment.

**Course Materials:**

- Recommended Textbook: *Lehninger: Principles of Biochemistry*, 4<sup>th</sup> or 5<sup>th</sup> edition.
- Textbook publisher's web site: <http://bcs.whfreeman.com/lehninger5e/>: Useful for Java-based interactive views of molecular structures and various animations. Interactive quizzes are useful to assess some foundational knowledge, but do not rely on it as a primary resource for exam preparation.
- Instructor-provided resources: Includes *learning objectives* (Word) and *"bridge" modules* (Word). These, along with all web project resources, will be distributed on Blackboard.

**Tentative Course Schedule:**

I am not fond of chapter-driven instruction, as it does not provide a flexible framework for formative assessment. In particular, pre-assessments have shown that most students begin this course with inadequate proficiency in areas of general and organic chemistry (corresponding to 16 semester hours of pre-requisites for this course). It has therefore been necessary for me to re-develop some of these areas before I can meaningfully engage students in the biochemistry. The following schedule is, therefore, a tentative one that will depend on formative student assessments.

**Section 1**

		First class session (Tue)...
Chapter 1 - Foundations of biochemistry	Week 1	8/28
Chapter 2 - Water	Week 2	9/4
Chapter 3 - Amino acids, peptides, and proteins	Week 3	9/11
	Week 4	9/18 <b>Exam 1: Thu, 9/20</b>

**Section 2**

Chapter 3 - Continued	Week 5	9/25
Chapter 4 - The 3D structure of proteins	Week 6	10/2
Chapter 5 - Protein function	Week 7	10/9
	Week 8	10/16 <b>Exam 2: Thu, 10/18</b>

**Section 3**

Chapter 6 - Enzymes	Week 9	10/23
Chapter 7 - Carbohydrates and glycobiology	Week 10	10/30
	Week 11	11/6
	Week 12	11/13 <b>Exam 3: Thu, 11/15</b>

**Section 4**

Chapter 8 - Nucleotides and nucleic acids	Week 13	11/20 <b>Web Project Due, 5:00 PM</b> No class on 11/22 (Thanksgiving)
Chapter 9 - DNA-based information techniques	Week 14	11/27
Chapter 10 - Lipids	Week 15	12/4

Finals Week **Exam 4: Thu, 12/13 10:00-11:50 AM**

### **Course Format:**

- Navigate to the "Content" folder on Blackboard to access all instructor-provided resources. Open a chapter folder to access all resources relevant to that chapter. Students should download and review all relevant materials prior to class. Resources include:
  - a. Learning Objectives - Aligned with textbook content. Level 400 and 500 students are responsible for mastery of all listed objectives, including the listed end-of-chapter problems from the textbook. I do not have time to cover all of these objectives. Instead, I will focus primarily on the higher-level objectives that are identified by cognitive verbs such as rationalize, construct, predict, or evaluate, and that often integrate with the modules. Technical writing proficiency is often lacking when students attempt these higher-level objectives, as they require a written responses that make relevant and tenable connections.
  - b. Modules - Considerable class time will be dedicated to modules, which include "bridge" problems into "real world" application areas. Module problems have been aligned with selected higher-level objectives. Mastery of these problems is expected of all students.
- As noted above, this course has a combined pre-requisite of 16 semester hours of general and organic chemistry. Accordingly, there is a competency expectation in areas of general and organic chemistry that are foundational to the biochemical topics in this course. Students are strongly encouraged to take early and ongoing initiative to remedy deficiencies. I'll support that effort, but the student will be the one to demonstrate the necessary content proficiency.

### **Exams**

- Exams will draw from the following sources: Learning objectives, end-of chapter textbook problems, and (especially) module problems. I am mostly interested in your ability to analyze or decode information that you have not seen before, such as the molecular properties of a pharmaceutical that I did not specifically discuss in class or include in a module. I am not as interested in your rote learning capacity, although a solid foundation in chemical language is essential and the exams will include this type of assessment. However, making connections and generalizing central concepts will be essential for success in this course. The objectives, in most cases, establish the groundwork for the modules. They should be your starting point, but not an end-point. Pace your study (very important) and always reflect on your learning. This course will support both peer group initiatives and think-pair-share activities to promote student self-evaluation.
- Technical writing skills include grammar, spelling, and legibility, and these will be factored into exam scoring. Memorization is inevitable in any course, and many courses are designed to encourage it. However, students that rely on this as their primary mode of learning will likely do no better than a C. As I mentioned already, keeping pace with all the material is essential, and always strive for comprehensive depth and clarity, not skimming or "cherry picking".

### **Wikis**

- The level-500 students will be held to a higher level of accountability, as required by university policy. Accordingly, these students will be specifically responsible for building wikis on Blackboard that provide accurate and clear responses to the objectives and assigned end-of-chapter problems. The level-500 students will be organized into teams that must work quickly but carefully to construct assigned chapter wikis, as I want these to become essential support resources for all students as they prepare for exams. The level 400 students will not be held accountable for generating the wikis. Instead, they will have an opportunity to post comments as a way of generating extra course credit, but the comments must be substantive and have a whole-class value in that it could highlight important areas that needs class discussion. Various factors can thwart comment posting by the level 400 student. Too much content, or content that is too in-depth, will discourage most undergraduates from posting comments, or using the wiki as a resource to prepare for the exams. Level 500 students should be attentive to this by adopting a

pedagogical perspective that is sensitive to the intended audience. Always keep in mind that you are trying to "reach" as many undergraduates as you can, and write responses to objectives accordingly but without compromising the integrity of a 400-level course. In particular, **do not** verbatim paste content or images without appropriate citation (unless they are your own), and be sure to include only enough content to provide a reasonable, clear response to each objective. Also, where appropriate, include a thoughtful question or two for various objectives to assess student understanding, encourage discussion, and provide a focus for the undergraduate. I will review the comments before each class to identify confusion areas, or to extend discussion, and will expect interaction from both level 400 and 500 students.

### **Web Project**

- Full details are provided on Blackboard, but here is an overview:  
Students will be paired into teams (but with no more than one 500-lvl student in a team). Each team will select a unique, pharmaceutical drug from the Drug-Port (or similar) database at the [EBI](#) (European Bioinformatics Institute) for which at least one target-drug PDB (Protein DataBank) structure is available. Teams are encouraged to make more than one selection (guidelines are provided), as . On approval of the selected drug by the instructor, the student team will conduct inquiry-based research using a template file. The project will be published online using a SharePoint workspace. Evaluation rubrics are also provided to clearly establish the scoring criteria.

### **Grading:**

- **Level 400 students:**  
Exams, which are based on learning objectives, end-of-chapter problems, and modules, will be weighted as follows: The lowest exam score will weight 10% and the remaining three exams will each weight 20%. A pattern of reflective wiki comments that promote class discussion and that have whole-class value (i.e. noting errors, identifying areas that require clarity, responding to embedded wiki questions...) can add as many as 5 points to your cumulative average for the four exams. The web project weights 30%.

#### Letter grade cutoffs:

A: 89 or above; B: 78 - 88; C: 65 - 77; D: 50 - 64; F: < 50

#### **Level 500 students:**

Each of the four exams weights 12% and the web project weights 30%. The remaining 22% will be determined by the chapter wikis that are assigned to each level 500 student. Criteria for scoring each wiki are defined by a rubric, and include posting a completed draft version of the chapter wiki by Wednesday at 5 PM for the week that begins that chapter (the exception is week 1; the draft for chapter 1 will be due Thursday at 5:00 PM); no verbatim copy and paste, no excessive content, clarity and accuracy, and pedagogical value (including, for example, questions to focus undergraduate comments). All level 500 students have the formative requirement of updating their wikis until 5 PM on the Tuesday of an exam week to correct errors or deficiencies. Only at that point will the wiki be scored.

Letter grade cutoffs: **In the plus/minus grading system, a C- does not give graduate credit.**

A: 95 and above; A-: 90 - 94; B+: 87 - 89; B: 83-86; B-: 80 - 82

C+: 77 - 79; C: 73 - 76; C-: 70 - 72; D: 60 - 69; F: < 60

### **Course Policies and Recommendations:**

- **Attendance:** Whole class attendance will be recorded on a random day each week by using an attendance sheet. This will not factor into your grade but will be used to cross-correlate with final grades. Level-500 attendance is mandatory, as it is your wiki work that is potentially the subject of class discussion. Anyone caught signing for another student will receive an automatic F.
- **Academic Dishonesty:** Anyone caught cheating or plagiarizing will be given an F for the course and the incident will be reported to the university judicial office. Only basic calculators are allowed during exams -

no graphing calculators or devices with USB ports. All other electronic devices (cell phones, smart phones, PDAs, iPods, etc.) are prohibited.

- *Behavior:* Please act respectfully. Examples: Do not read newspapers during class; remember to silence your phones and to put them away; avoid talking, unless engaged in a group activity or class discussion....
- *Work Ethic:* it is strongly recommended that you download all chapter materials from the Content area on Blackboard before the material is discussed in class. Preparatory pacing is very important. There is a lot of material, and the worst mistake you can make is waiting until an exam week before you start giving the material serious attention.

***Other:***

- *Disability Statement:* Students with disabilities will be accommodated. Anyone needing special access should speak to me early in the semester. CAAR forms are required.